Special Circular 114 November 1987

Becker Soft Red Winter Wheat

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Ohio Agricultural Research
and Development Center
The Ohio State University
Wooster, Ohio

Contents

11-87-750

Becker Soft Red Winter Wheat

H. N. LAFEVER[1]

Becker soft red winter wheat is a high yielding, extremely stiff strawed variety which was officially released in 1985. Seed was first made available to the public in the fall of 1986. Becker is named in honor of the late Roy Becker, long-time Secretary-Manager of the Ohio Seed Improvement Association and a strong supporter of agricultural research. Becker has been tested in replicated, drilled plot trials in Ohio since 1980. The overall performance of Becker is compared with other varieties of current interest in Tables 1-4. A Plant Variety Protection application (Application No. 8600152) has been filed for Becker with the provision that seed of Becker be sold or offered for sale only as a class of certified seed and must be labeled as a protected variety. This variety will be multiplied in what is known as a two-generation system; that is, only the foundation and certified classes of seed are allowed beyond breeder seed.

Origin

Becker originated in Ohio from the cross: Hart x Va. 66-54-10, the latter being an experimental line developed by the Virginia Agricultural Experiment Station. The cross was made in 1972. Becker was first selected as a single F_3 plant in 1975, followed by reselection within the progeny of this single plant in the F_7 generation in 1979. Breeder seed consists of the bulked progeny of 17 F_7 plants selected for uniformity in 1979 and later years. The pedigree 22272-19 was used to designate this line in early tests until it was given the advanced line designation "OH 234" in 1979.

Performance

Becker was first tested in a replicated micro-plot yield trial at Wooster in 1978 and first entered in state-wide drilled plot trials in 1980. Forty-two drilled plot trials have since been conducted comparing Becker with other varieties in production in Ohio. Yearly average yields are shown in Table 1 while location averages over a period of years are summarized in Table 2. Other performance data are given in Tables 3 and 4.

As shown in Tables 1 and 2, Becker has exhibited excellent yields in comparison to currently popular varieties in Ohio trials over a seven-year period although it has not consistently ranked first every season or in every location. No evidence exists that Becker performs relatively better or worse than other varieties in any certain region of the state. There is evidence, however, that Becker performs better relative to other varieties in high-yield environments. Close examination of the data in Table 1 supports the hypothesis as well as a two-year high yield study summarized in Table 5.

The extremely high N rates reported in Table 5 are not recommended for farm production, but rather were used to determine the upper limits

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Table 1. Comparative yields (bu/a.) of Becker and other currently grown varieties in drilled plot trials by years, Ohio.

Variety	1980 3 tests	1981 7 tests	1982 7 tests	1983 7 tests	1984 6 tests	1985 6 tests	1986 6 tests	Avg. 17 tests	Avg. 25 tests	Avg. 42 tests
Arthur	57.9	41.8	57.8	--	--	--	--	51.2	--	--
Adena	68.3	46.9	58.8	58.1	57.7	76.4	53.9[1]	55.6	61.4	59.0
Becker	73.5	49.5	59.9	63.5	56.5	83.3	57.1	58.0	65.0	62.2
Caldwell	--	--	59.0	--	--	--	54.1	--	--	--
Hart	69.3	52.1	62.5	57.7	55.3	78.3[1]	54.9	59.4	64.0	60.6
Logan	62.1	43.6	59.1	--	--	--	--	53.2	--	--
Ruler	65.3	43.7	56.2	--	--	--	--	52.7	--	--
Titan	71.0	47.9	61.1	60.1	51.3	77.9	54.5	57.4	60.9	59.5
Tyler	--	--	--	64.2	57.5	75.3	57.4	--	63.6	--

[1] No data available for this variety this single year. Adjusted values reported are based on relative performance in remaining years.

Table 2. Comparative yields (bu/a.) of Becker and other currently grown varieties in drilled plot trials by location, Ohio

Variety	OARDC Wooster 1980-86	Northwestern Br.,Custer 1980-86	Western Br. S. Charleston 1980-86	Mahoning Co. Farm,Canfield 1981-86	Veg. Crops Br. Fremont 1981-86	Southern Br. Ripley 1981-86	O.F.S. Croton 1981-83	Average 42 tests
Adena[1]	61.1	74.5	53.8	47.7	72.5	49.6	45.1	59.0
Becker	67.5	74.4	56.5	53.1	78.1	53.3	39.6	62.2
Hart[2]	62.6	73.1	52.7	52.6	72.9	55.5	46.4	60.6
Titan	62.3	70.3	52.3	54.0	72.8	51.7	45.0	59.5

[1] No data available for 1986. Adjusted values reported are based on relative performance in remaining years.

[2] No data available for 1985. Adjusted values reported are based on relative performance in remaining years.

Table 3. Comparative performance of Becker and currently grown varieties in drill plot trials, Ohio, 1980-86. (Average of 42 tests)

Variety	Winter Survival (%)	Pl. Height (in.)	Date Headed (May)	Lodging (%)	Test Wt. (lb/bu)
Adena[1]	98	33	24	7	56.8
Becker	96	32	26	1	55.8
Hart[2]	96	36	24	4	57.8
Titan	94	38	28	14	56.7

[1] No data available for 1986. Adjusted values reported are based on relative performance in remaining years.
[2] No data available for 1985. Adjusted values reported are based on relative performance in remaining years.

Table 4. Comparative disease and aluminum tolerance ratings of Becker and currently grown varieties in miscellaneous Ohio tests.

			Leaf Rust				Al. tolerance	
							Avg. yield	
Variety	% Mildew 16 tests 7 years	WSSM[1] 6 tests 4 years	G.H.[1] 1 test	Field[2] 8 tests 5 years	% Scab 2 tests 2 years	Take-all[1] 1 test	(% of Seneca) 4 tests 4 years	Avg. score[3] 8 tests 8 years
Adena[4]	30	.75	7	21-MR	5	3	56	5.5
Becker	67	2.00	4	4-MR	9	4	75	4.0
Hart[5]	66	1.00	6	29-S	29	2	52	7.1
Titan	26	2.00	7	9-MS	12	3	76	3.4

[1] 0 = none to 9 = severe.
[2] Percent of flag infected-pustule size where S = Susceptible, MS = Moderately Susceptible, MR = Moderately Resistant, R = Resistant.
[3] 0 = very tolerant to 9 = very sensitive.
[4] No data available for 1986. Adjusted values reported are based on relative performance in remaining years.
[5] No data available for 1985. Adjusted values reported are based on relative performance in remaining years.

Table 5. Results of high yield studies involving Becker, Caldwell and Tyler wheats at 3 spring nitrogen topdressing rates, Wooster, 1985 and 1986.

Variety - Treatment[1]	Yield (bu/a)[2]			Lodging (%)		
	1985	1986	Avg.	1985	1986	Avg.
Becker - 60 lb/a N	97.9[b]	71.8[a]	84.9	0	7	4
Becker - 120 lb/a N	107.3[a]	69.1[ab]	88.2	15	93	54
Becker - 180 lb/a N	109.8[a]	64.6[c]	87.2	15	93	54
Caldwell - 60 lb/a N	88.2[d]	67.7[bc]	78.0	13	79	46
Caldwell - 120 lb/a N	91.0[cd]	59.1[d]	75.1	81	100	91
Caldwell - 180 lb/a N	92.8[c]	59.6[d]	76.2	78	100	89
Tyler - 60 lb/a N	86.4[d]	67.8[bc]	77.1	7	68	38
Tyler - 120 lb/a N	88.0[d]	56.6[de]	72.3	53	98	76
Tyler - 180 lb/a N	90.5[cd]	54.5[e]	72.5	53	98	76

[1] Bayleton applied to all plots at late boot stage (4oz/acre). Nitrogen applied in split applications; half in mid-March and half in mid-April.

[2] Means followed by the same letter within each column are not significantly different at the 5 % level of significance.

of straw strength and yield. The cause of Becker excelling in high yield environments is thought to be due to its extreme straw strength and associated reduced lodging occurrence (see Tables 3 and 5) as well as its inherently high-yield potential. The straw strength of Becker sets a new standard of excellence for this trait as it exceeds the straw strength of all currently grown varieties.

Becker has excellent winter hardiness, approximately equal to the most winter hardy varieties now grown commercially.

Characteristics

Becker is mid-season in maturity; heading on average about three days later than the earliest varieties such as Caldwell and three days earlier than late varieties such a Titan.

Becker is one of the shortest varieties available (Table 3). It has averaged three inches shorter than Caldwell and Scotty in studies not reported here and one inch shorter than Adena.

Test weight of Becker is classed as medium. Most currently grown varieties exceed Becker in test weight. Becker is tolerant to acid soil conditions, being about equal to Titan and considerably more tolerant than Adena and Hart (Table 4) in this respect.

Becker is a beardless variety with few, short apical awns. Foliage is usually dark green except under low fertility conditions and flag leaves are usually erect at heading except under very high fertility conditions. At maturity Becker heads are erect, tapering, mid-dense with white chaff.

Insect and Disease Resistance

Becker is very resistant to soil-borne spindle streak mosaic virus and is resistant to loose smut. During the late stages of its development but early in its testing, new races of powdery mildew developed which are virulent on Becker. Its excellent yield record, however, was accomplished in trials involving standard farm production procedures. That is, no fungicides were applied to Becker in any of the trials reported in Tables 1-4. Thus, the variety appears able to withstand high levels of powdery mildew infection while still exhibiting excellent yields. Studies with powdery mildew controlling fungicides, however, have shown highly economical yield responses. Becker has also shown moderate resistance to leaf rust, but new races appear to be occurring in the past two years which can attack the variety. Becker possesses resistance to only races A and C of Hessian Fly; the same type of resistance present in Hart or Titan.

Milling and Baking Quality

In evaluation of samples submitted to the USDA Soft Wheat Quality Laboratory from several locations over the past six years, Becker has proven to have excellent flour quality, usually exceeding Hart, Titan and Tyler and

approximately equaling Adena in both milling and baking scores. Becker usually is among those soft red winter wheat varieties with the lowest percent protein, thus making it an ideally suited variety for production under high fertility (especially high nitrogen) conditions in that its expected protein content should not increase above acceptable levels for soft red winter wheat products.

Availability

Limited seed was first made available to the public in the fall 1986. The variety should be widely available for fall of 1987 and subsequent seedings. Breeder seed will be maintained by the Ohio Agricultural Research and Development Center, The Ohio State University, Wooster, OH 44691. Becker has been accessioned as P.I. 494524 in the USDA wheat collection.

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